

# Digestive Rate of Dongtian F<sub>1</sub> Red Deer in Weaning Period and Growth Period

Ma Zefang (马泽芳)

College of Wildlife Resource, Northeast Forestry University, Harbin150040, P. R. China

Zhao Yufang (赵玉芳)

Harbin Specialty Research Institute

Zheng Xueli (郑雪莉)

Northwest Forestry College

Li Zhengnan (李铮男) Zou Qi (邹奇)

Northeast Forestry University, Harbin150040, P. R. China

**Abstract** In this paper, 4N-HCLAIA method was adopted to conduct digestive tests in young female and male Dongtian F<sub>1</sub> red deer (*Cervus elaphus*) of rearing separately in growth period and mixed raising in weaning period in Harbin Specialty Research Institute. Results indicated that digestive rate of crude protein and crude fiber were 95.35% and 73.68% respectively when rational protein content was 26.8% in growth period. Digestive rate was not significantly different between female and male ( $P>0.05$ ); During weaning period, when rational crude protein content is 22.06%, digestive rate of crude protein and crude fiber were 93.05% and 63.96%, respectively. The tests suggest that higher rational protein can be effective in accelerating growth of young Dongtian F<sub>1</sub> red deer during growth period and weaning period (before 10 months old).

**Key words:** Weaning period, Growth period, Dongtian F<sub>1</sub> Red deer, *Cervus elaphus*, Digestive rate

## Introduction

Deer is a mammalian species of important economic values. Deer parts such as pilose antler, blood, meat, tail, penis and placenta are used as nutriment and deer skins as light industrial material. Deer can be easily domesticated. So deer raising industry has been expanded rapidly around the whole country. Among all deer species raised in farms, red deer becomes main species raised for its large body shape, high pilose antler production, good adaptability, high bearing ability of row feed and easy management.

In the northeastern part of China, the subspecies Dongbei red deer is widely bred in farms. With a long time captive breeding, the populations have lost a great deal of original characters. They mainly exhibit smaller body shape, lower pilose antler productivity, lower quality of antlers, etc.. This degeneration goes opposite to the expanding market of deer products, ruins economic interests and threatens the deer raising industry. In order to recover the situation, frozen semen of the subspecies Tianshan red deer were introduced in the population of Dongbei red deer. The new crossbreeding generation Dongtian F<sub>1</sub> red deer is more productive than Dongbei red deer and has an attractive future. However, feeding experience is poor. We are now short of scientific theoretical support and available feeding standard. In this case, we carry out this study on the digestive rate of young

Dongtian F<sub>1</sub> red deer during weaning period and growth period for the sake of finding a scientific feeding standard.

## Materials and Methods

### Materials

The digestive tests were conducted on Dongtian F<sub>1</sub> red deer in weaning and growth period in Harbin Specialty Research Institute in March and December, 1997. The grouping is shown in Table 1. Female and male young deers in weaning period were mixed raised, and separately in growth period. Conventional ration was used in the tests (Table 2 and 3).

**Table 1. Grouping of animals involved in the tests**

Raising period	Month old	Sex	Number	Total number
growth period	9-10	male	4	12
		female	8	
weaning period	4-6	male	8	13
		female	5	

**Table 2. Rational composition in growth period**

rational content (%)	concentrates 31.3			roughage 68.7			
	corn flour	bean cake	wheat bran	poplar leaf	dry grass	silage corn	carrot
	60.0	30.0	10.0	10.0	20.0	45.0	25.0
feed quantity (Kg/day/animal)	1.50	0.75	0.25	0.45	1.35	2.70	2.20

**Table 3. Rational composition in weaning period**

Rational content(%)	Concentrates 27.7					Roughage 72.3			
	Corn flour	Bean cake	Wheat bran	NaCl	CaHPO <sub>4</sub>	Poplar leaf	Dry grass	Ailage corn	Carrot
	63.0	25.0	10.0	1.0	1.0	25.0	25.0	33.3	16.7
Feed quantity(Kg/day·animal)	1.26	0.50	0.20	0.02	0.02	1.50	1.50	2.00	1.00

## Methods

Since deer were raised with conventional ration in Harbin Specialty Research Institute before the experiment, tests were carried out directly without necessarily prefeeding phase. Tests lasted for 3 days. In the pens, totally 100g feces was collected at 20 places (5g at each place) every morning. Feces samples of male and female were collected respectively for growth period group while mixed for weaning period group. Feces samples were put into bottles and added 10% HCl 20 mL. Analysis were carried out in our lab.

Quarter-sampling methods was used in collecting 100g of various forage and mixed feed. Feed samples were kept in bottles.

Nutrients in feed samples and feces samples were analyzed with the methods of Experiments Guide of Domestic Animal Raising ed. by Beijing Agriculture University in the Feeding and Nutrition Lab of Northeast Forestry University. Feed and feces heat energy of weaning group were analyzed with re-equipped GR-3500 Oxygen chamber thermal meter.

4N-HCLAIA method was used in the digestive rate tests.

## Results

### Nutritive ingredients contents of feed and feces samples

Nutritive ingredients contents of feed and feces samples of weaning and growth period are shown in Table 4 and Table 5.

**Table 7 Digestive rate of nutritive ingredients of young Dongtian F<sub>1</sub> red deer(%)**

		crude protein	crude ash	crude fat	crude fiber	nitrogen free extract	dry matter	energy
growth period	male	94.70	90.93	93.90	73.27	96.50	94.10	
	female	96.00	92.30	93.63	74.10	96.00	94.50	
	t-test	p>0.05	p>0.05	p>0.05	p>0.05	p>0.05	p>0.05	
	X	95.35	91.62	93.77	73.69	96.25	94.30	
weaning period		93.03	79.64	91.21	63.96	94.85	92.54	93.34

## Discussion

Young red deer in both growth period and weaning period exhibit a high digestive rate of all kinds of nutritive ingredients involved in this study. This illustrates that synthetical metabolism of young deer are active. A large amount of substance deposits inside.

**Table 4. Percentage of nutritive ingredients in dry matter of growth period samples**

Nutritive ingredients	Crude protein	Crude ash	Crude fat	Crude fiber	Nitrogen free extract
feed	26.8	13.2	5.7	2.8	36.8
feces	male	17.7	14.8	4.3	9.3
	female	13.9	13.4	4.7	9.4

**Table 5. Percentage of nutritive ingredients in dry matter and energy content of weaning period**

Nutritive ingredients	Crude protein	Crude ash	Crude fat	Crude fiber	Nitrogen free extract	Energy (kJ/kg)
feed samples	22.06	6.18	4.05	2.40	62.60	16619.57
feces samples	20.58	17.32	4.72	11.65	42.87	18150.10

### Results of 4N-HCLAIA content in feed and feces samples

The contents of 4N-HCLAIA in feed and feces samples during growth and weaning period are shown in Table 6.

**Table 6. Percentage content of 4N-HCLAIA in samples**

Samples of growth period			Samples of weaning period	
feed	feces		feed	feces
0.50	6.20(male)	6.50(female)	0.45	6.18

### Results of digestive rate analysis

After the data in Table 4, 5, 6 were put into digestive rate formula, digestive rate of young Dongtian F<sub>1</sub> red deer during growth and weaning period were resulted as shown in Table 7.

Therefore, high nutrients ration should be available to meet the demand of growth.

Digestive rate test (t-test) shows that there is no significant difference between male and female young deer in growth period(p>0.05). It suggests that there is no sex difference in digestive rate in young Dongtian F<sub>1</sub> red deer. The digestive rate data obtained in the study can represent the digestive rate of

the whole population.

Young deer show a low digestive rate of crude fiber. This is accordance with that the remen function is not very matured to digest crude fiber. Crude fiber can be digested better in growth period than weaning period because remen in this period is more functional.

Ration samples collected in growth period and weaning period consist of 26.80% and 22.06% protein respectively. Results gained from the these samples are sensible to direct the ration formulation in practice. However, the digestive rate of nutritive ingredients of different protein levels in this period are not involved in this study. It should be done to perfect the feeding standard.

## Conclusions

During growth period and weaning period, when rational protein in reaches 26.80% and 22.06% respectively, the digestive rate of crude protein and crude fiber is: 95.35% and 73.9% in growth period, 93.03%

and 63.96% in weaning period.

The digestive rate of young Dongtian  $F_1$  red deer is not significantly different in sex in growth period ( $p>0.05$ ).

The growth and development of young Dongtian  $F_1$  red deer can be accelerated during weaning and growth period when they are fed with high protein ration.

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(Responsible Editor: Chai Ruihai)